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IN THE APPLICATION

OF

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FOR A

VEHICLE SUSPENSION LIFT SPACER

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VEHICLE SUSPENSION LIFT SPACER

BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION

The present invention relates to vehicle suspensions. More particularly, the present invention relates to suspension lift spacers for use with coil springs.

2. DESCRIPTION OF THE RELATED ART

The use of vehicles for off-road travel is popular to reach remote camping, fishing, and hunting locations and has developed into a sport in itself. It is common to employ spacers to the suspension to lift the vehicle relative to the ground so as to increase its clearance. This allows the use of larger tires and to travel over rugged terrain. The use of standard pickup trucks and the like for off-road adventure driving is common, however, their suspensions are not originally designed for such use. The use of suspension lift spacers in the suspensions improves their utility for off-road use by increasing ground clearance for rough terrain. Such spacers must be designed for each particular truck make and model. The Dodge Ram 1500 truck,

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for example, has coil springs and thus requires a spacer fitting between the coil spring and the upper or lower spring receiver and must accommodate an axial shock absorber. Lift spacers are presently available, typically in 2" and 3" lift sizes, however known spacers require special casting and/or expensive machining. It would be desirable to provide such a suspension lift which is simple in design, made from readily available plate and cylinder stock, requires no expensive machining, and is sufficiently rugged for its intended use.

U.S. Patent No. 3,830,482, issued August 20, 1974, to Norris describes an adjustable coil spring lifter to provide lift or restore loaded spring height.

U.S. Patent No. 6,149,171, issued November 21, 2000, to Bono et al. describes a coil spring isolator for a vehicle suspension.

U.S. Patent No. 6,188,039, issued February 13, 2001, to Gass, describes a projection welded panel spacer and the method for making the spacer by welding flats to tube stock.

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U.S. Patent No. 6,481,071 B1, issued November 19, 2002, to Newhan, describes a suspension kit to raise a vehicle front end.

U.S. Patent No. 6,543,828 B1, issued April 8, 2003, to Gass, describes a welded panel spacer and method of making the spacer.

U.S. Patent No. 6,642,471 B2, issued November 4, 2003, to Imai et al., describes a method for welding steels including plate to cylindrical stock.

Internet Website http://Performancelifts.com describes a Daystar 02-24 Ram 1500 2" lift spacer.

Internet Website http://www.daystarweb.com describes front coil spring spacer kits for Dodge Ram 1500 suspensions.

Internet Website http://rough.roughcountry.com of Rough Country a division of Heckethorn Products, Inc. is a source for a coil spring spacer for Dodge Ram 1500 suspensions (See Fig. 5 of the instant application).

None of the above inventions and patents, taken either singly or in combination, is seen to describe the instant

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invention as claimed. Thus a vehicle suspension lift spacer for Dodge Ram 1500 trucks solving the aforementioned problems is desired.

SUMMARY OF THE INVENTION

The vehicle suspension lift spacer of the present invention is designed to fit between the upper end of the coil spring and the upper spring receiver of the front suspension of a Dodge Ram 1500 truck. It is made by cutting and welding stock flat and cylinder stock material, making it cheap to make and sufficiently rugged for the desired use. No special casting or machining is required. The lift spacer is generally cylindrical, having a central axis in common with the axially mounted shock absorber extending downward therethrough. The lift spacer has an upper attachment plate in the shape of a flat ring having equally spaced bolts extending upward for attachment through the upper coil spring receiver and shock tower mounts.

The lift member is a cylindrical section of appropriate length and is welded coaxially to the underside of the upper attachment plate. A bearing plate in the shape of a flat ring is coaxially welded to the lower edge of the cylindrical lift member for bearing against the upper end of the coil spring. A cylindrical guide member is welded to and coaxially depends from

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the lower side of the bearing plate to maintain the lift member properly placed relative to the outer coil spring and the inner shock absorber. The spacer may be provided in desired lengths, and typically 2" and 3" lengths. The desired length is obtained by selecting the length of the cylindrical section, the thickness of the upper attachment plate and bearing plate remaining a constant. The lift spacer may be made from steel or other appropriate material.

It is an aspect of the invention which provides improved elements and arrangements thereof for the purposes described which is inexpensive, dependable and fully effective in accomplishing its intended purposes.

These and other aspects of the present invention will become readily apparent upon further review of the following specification and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is an environmental, perspective view of a suspension lift spacer according to the present invention.

Fig. 2 is a section view drawn along lines 2-2 of Fig. 1.

Fig. 3 is a bottom view of the suspension lift spacer of Fig. 1.

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Fig. 4 is an exploded view of the suspension lift spacer of Fig. 1.

Fig. 5 is a prior art suspension lift spacer.

Similar reference characters denote corresponding features consistently throughout the attached drawings.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention is a coil spring suspension lift spacer for insertion between a coil spring and its upper receiver. The inventive lift spacer increases the clearance of the vehicle for off-road use. This lifts spacer is particularly useful in coil spring suspensions where the shock absorber extends axially through the coil spring.

Referring to Fig. 1, there is shown an environmental, perspective view of the coil spring suspension lift spacer referred to by reference number **10**. Lift spacer **10** is integral and generally cylindrical in shape, defining a central axis, and includes an upper attachment plate **12** configured as a flat ring, a cylindrical lift member **14** depending from the attachment plate **12** defining the height of lift of the lift spacer **10**, a bearing plate **16** configured as a flat ring and depending from the cylindrical lift member **14**, and a cylindrical guide member **18** depending from bearing plate **16**. Upper attachment plate **12** has

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a peripheral portion having three threaded securing bolts equally spaced around its circumference proximate the outer edge thereof and extending upward therefrom.

As shown in Fig. 1, coil spring **S** is vertically separated from coil receiver **R** by lift spacer **10**, thus adding height to the suspension represented by vehicle suspension arms **A**. Generally, suspension arms **A** are permanently attached to coil receiver **R** by welding. A suspension tower **T** is in the general shape of a tripod and is generally bolted at its base to the upper side of coil receiver **R** proximate the periphery thereof. The suspension tower **T** provides an upper mount for shock absorber **S**. Shock absorber **S** extends axially downward through coil spring **C** and is mounted at the base thereof (not shown) in a known manner. With lift spacer **10** in place, upper attachment plate **12** bears against the lower surface of coil spring upper receiver **R** and bolts **20** act as studs and take the place of the original suspension bolts (not shown), extending upward through the existing bolt receiving bores of receiver **R** and the lower legs of shock tower **T** and are secured by washers **60** and nuts **62** (see Fig. 4). A ring-like rubber isolator (not shown) conforming to the underside of coil receiver **R** is supplied with the suspension to provide sound and vibration isolation from the

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coil spring **C** to the upper suspension. During installation of the inventive lift member, this rubber isolator may be placed between the top of the coil spring **C** and the bearing plate **16** (not shown) as desired to provide sound and vibration isolation from the lower suspension and spring to the inventive lift spacer **10**.

Lift member **14** is a section of cylindrical pipe or steel stock, the length of which may be selected to determine the amount of lift added to the vehicle suspension. Bearing plate **16** bears against the upper end of coil spring **C**, performing the function of coil receiver **R** in the original suspension configuration. Guide member **18** extends axially downward in the annular space between coil spring **18** and shock absorber **S** to maintain lift spacer **10** in alignment with coil spring **C** while allowing the shock absorber **S** to extend therethrough.

Upper attachment plate **12** has a first outer diameter such as to fit within upper spring receiver **R**. Lift member **14** has a second outer diameter which is less than the first diameter defined by upper attachment plate **12** so as to provide clearance for installation of securing bolts **B**. Bearing plate **16** has an outer diameter equal to or larger than the first outer diameter defined by said upper attachment plate **12**. Guide member **18** has

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a fourth diameter less than the diameter of bearing plate **16** and is of such an outer diameter as to fit axially within coil spring **C**. Guide member **18**, as well as the other components of the lift spacer 10 has an inner diameter at least sufficient to receive an axial shock absorber therethrough.

Referring to Fig. **2**, there is shown a sectional view through lift member **14** of vehicle suspension lift member **10** looking upward. Attachment plate **12** is in the form of a flat ring having an upper surface with outer edge **22** and an inner edge **24**. Lift member **12** is a cylindrical segment having an upper edge and a lower edge and an outer surface **34** defining an outer diameter and an inner surface **32** defining an inner diameter. Lift member **12** is spaced outward from inner edge **24** of attachment plate **12** and is secured to its lower surface **26** by welding as illustrated by weld beads **W**. Bolt heads **30** of bolts **20** are welded in place to the lower surface **26** of the peripheral portion as illustrated by weld beads **W**. Bolts **20** are equally spaced around a peripheral portion of upper attachment member **12** proximate its outer edge **22** and extend upward from heads **30** through corresponding throughbores (see Fig. 4) for securing lift spacer **10** to coil spring upper receiver **R** and shock tower **T** (see Fig. 1).

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Referring to Fig. 3, there is shown a bottom view of vehicle suspension lift spacer **10** showing bearing plate **16** and guide member **18**. Bearing plate **16** has a flat ring configuration and is mounted coaxially and depending from lift member **14** by welding as illustrated by weld bead **W**. Bearing plate **16** has an upper surface having an outer edge **40**, defining an outer diameter, and an inner edge **42**, defining an inner diameter thereof. Guide member **18** is mounted coaxially with bearing plate **16** by welding to its lower surface **44**, as illustrated by weld bead **W**, proximate and spaced outward from inner edge **42**. Guide member **18** has an upper edge and a lower edge and has an outer surface **50** defining and outer diameter and an inner surface **52** defining an inner diameter. The outer diameter of guide member **18** as defined by outer surface **50** is preferably about equal to or less than the inner diameter of lift member **14** and is axially mounted relative thereto. Guide member **14** is preferably of sufficient length to maintain the spacing of coil spring **C** and shock absorber **S**.

Referring to Fig. 5, there is shown an exploded view showing the upper attachment plate **12**, lift member **14**, bearing plate **16**, and guide member **18** as axially aligned. Also shown are the securing bolts **20** as aligned with spaced throughbores in

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upper attachment plate **12** and having washers **60** and nuts **62**. Although it is preferred that bolts **20** be welded to attachment plate **12** as shown in Fig. 2, they may be separately inserted when mounting lift spacer **10** in the vehicle suspension.

Fig. 5 shows an environmental elevation view of a prior art vehicle suspension lift spacer for coil springs. In this design, the lift spacer is generally cylindrical and the lift member **L** is made of cast iron, machined to form an integral unit, the wall curving upward and outward to form a ring for mounting securing bolts **B**. A bearing plate **BP** is welded to lift member **L** along the internal wall (not shown). A guide member **G** is welded to bearing plate **BP** along the internal wall (not shown). This vehicle suspension lift spacer is available for Dodge Ram 1500 trucks from the Rough Country, a division of Heckethorn Products, Inc., 1400 Morgan Road, Dyersburg, TN, having the Internet address http://rough.roughcountry.com.

The two flat rings for the upper attachment plate **12** and the bearing plate **16** of the lift spacer of the present invention are preferably laser cut from 1/4" mild steel stock with an outer diameter of about 6 1/2" and an inner diameter of from about 3" to about 3 1/2" for passage of the shock absorber. The lift member and the guide member of the present invention are

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preferably cut from appropriate sized mild steel cylindrical stock, pipe, or tubing. The lift member **14** is cut from 3/16" wall thickness tubing. The length of the lift member is selected for the amount of lift desired, a 2" lift spacer requiring a 1 1/2" lift member and a 3" lift spacer requiring a 2 1/2" lift member. The guide member **18** is cut from 1/8" wall thickness tubing about 1 3/8" in length and has an inner diameter of at least 3". The diameter of the lift member 18 is preferably greater than that of guide member **18** to impart maximum strength to the lift spacer assembly.

Welding may be carried out with a conventional welder. Assembly and welding is preferably carried out in an inverted fashion by axially aligning the lift member **14** on the lower side of attachment plate **14** and welding along the upper edge of lift member **14** on both inner and outer sides; axially aligning bearing plate **16** on the lower edge of lift member **14** and welding along the lift member lower edge on its inner side; and axially aligning guide member **18** on the lower surface **44** of bearing plate **16** and welding along the upper edge of inner and outer walls **52** and **50**, respectively. The securing bolts **20** may then be inserted in the throughbores in the peripheral portion of attachment plate **12** and the heads **30** welded to the lower surface

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26 of attachment plate 12. Welding of the material can be performed inside the cylindrical tubing or pipe, outside, or a combination of both.

It is to be understood that the present invention is not limited to the embodiments described above, but encompasses any and all embodiments within the scope of the following claims.

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